

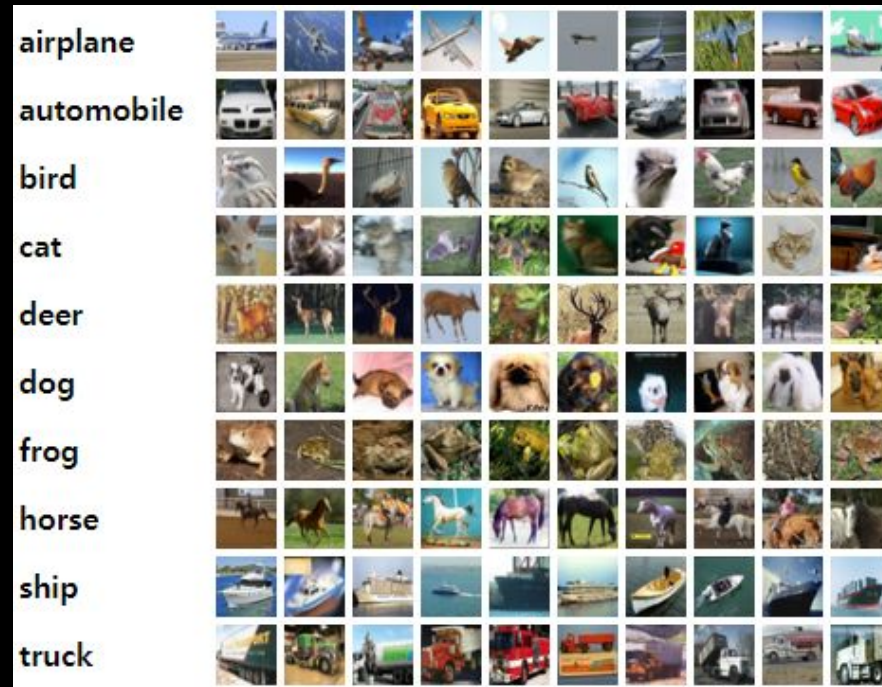
# 딥러닝 기초

-09-

이미지 분류

# 사물 분류

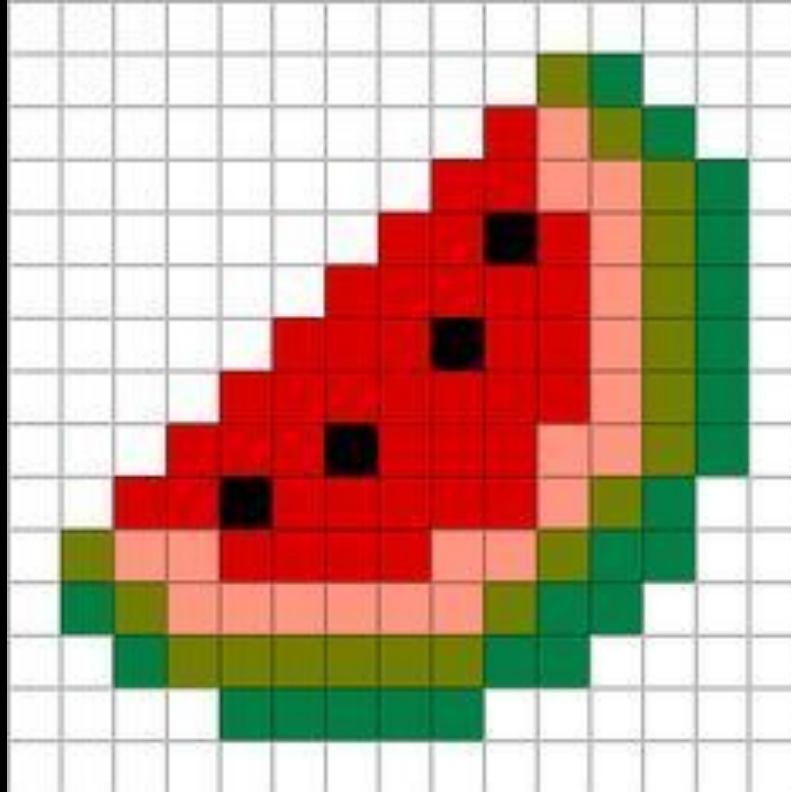
# CIFAR-10



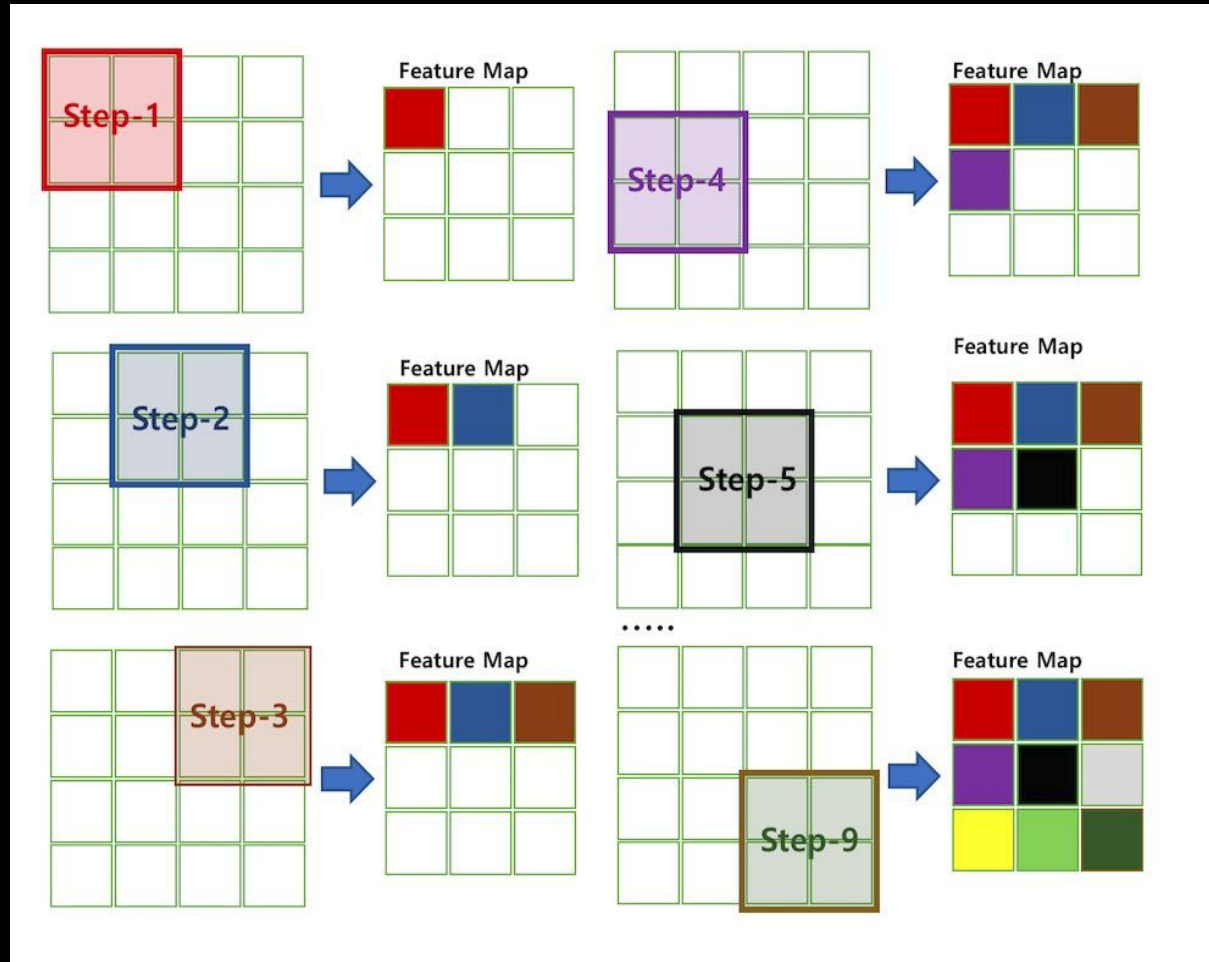
The CIFAR-10 dataset consists of **60000 32x32 colour images in 10 classes**, with 6000 images per class. There are 50000 training images and 10000 test images.

# Convolutional Neural Network

# CNN (Convolutional Neural Network)

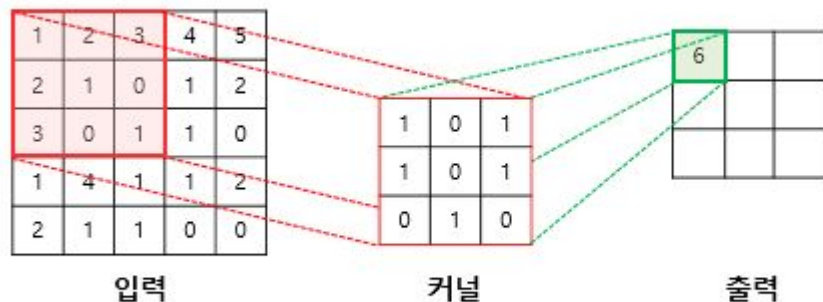


# Convolutional Layer



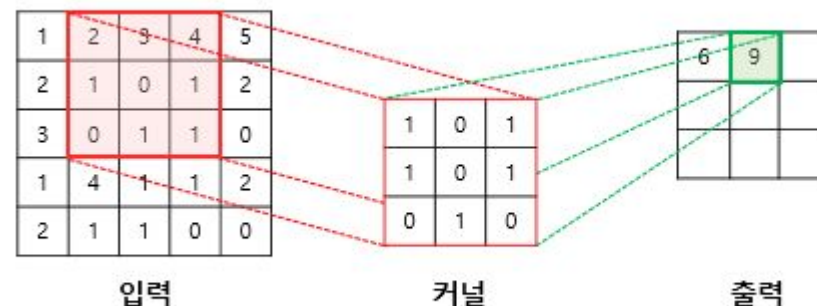
# Convolutional Layer

## 1. 첫번째 스텝



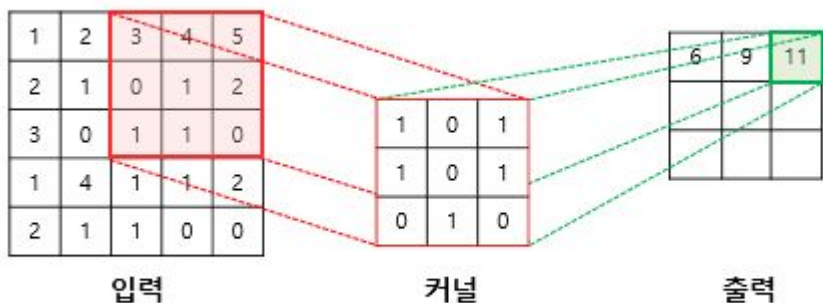
$$(1 \times 1) + (2 \times 0) + (3 \times 1) + (2 \times 1) + (1 \times 0) + (0 \times 1) + (3 \times 0) + (0 \times 1) + (1 \times 0) = 6$$

## 2. 두번째 스텝



$$(2 \times 1) + (3 \times 0) + (4 \times 1) + (1 \times 1) + (0 \times 0) + (1 \times 1) + (0 \times 0) + (1 \times 1) + (1 \times 0) = 9$$

## 3. 세번째 스텝



$$(3 \times 1) + (4 \times 0) + (5 \times 1) + (0 \times 1) + (1 \times 0) + (2 \times 1) + (1 \times 0) + (1 \times 1) + (0 \times 0) = 11$$

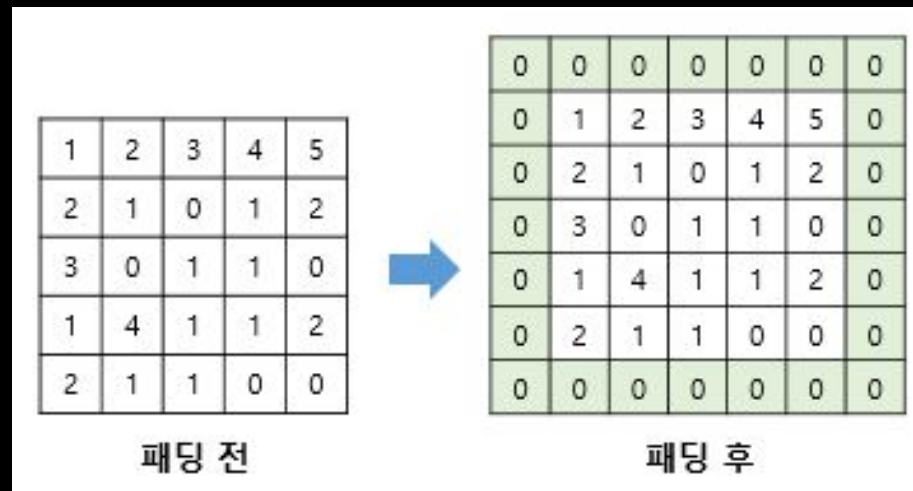
...

6	9	11
10	4	4
7	7	4

특성 맵(feature map)

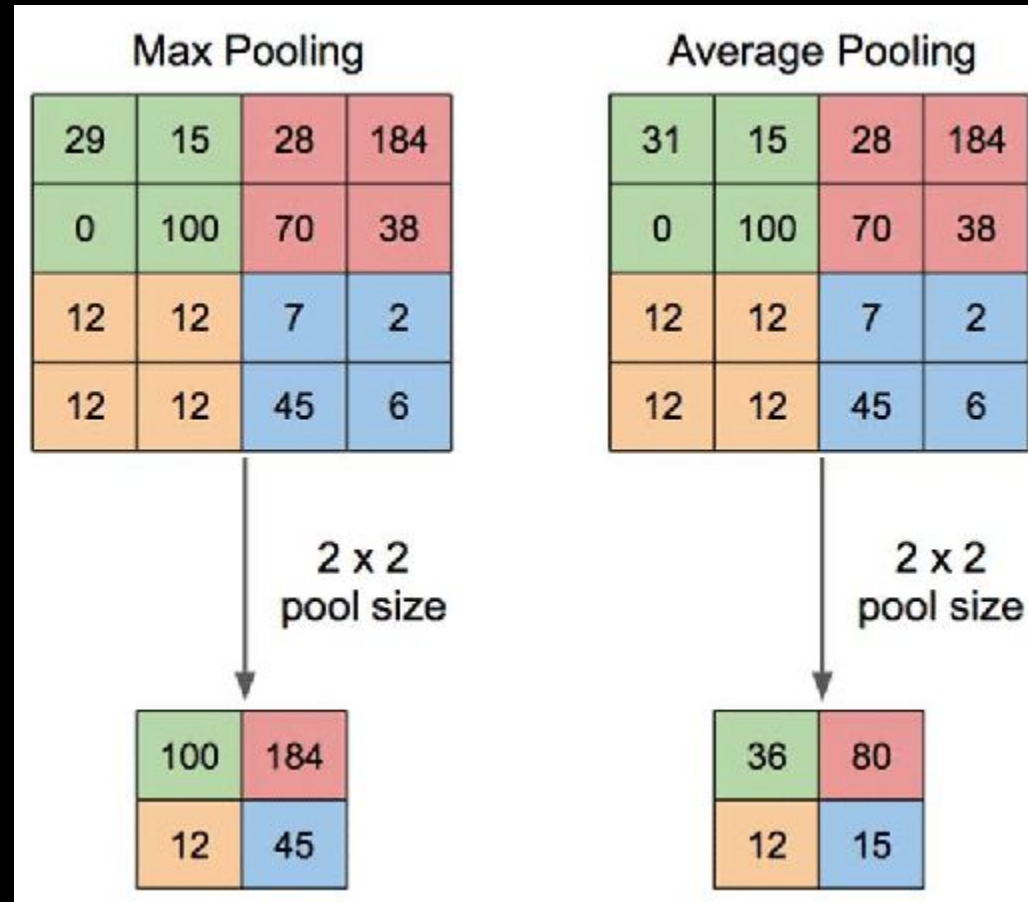
# Convolutional Layer

합성곱 연산의 결과로 얻은 특성 맵은 입력보다 크기가 작아진다는 특징  
합성곱 층을 여러개 쌓았다면 최종적으로 얻은 특성 맵은 초기 입력보다 매우 작아짐  
특성 맵의 크기가 입력의 크기와 동일하게 유지되도록 하고 싶다면 패딩(padding)을 사용

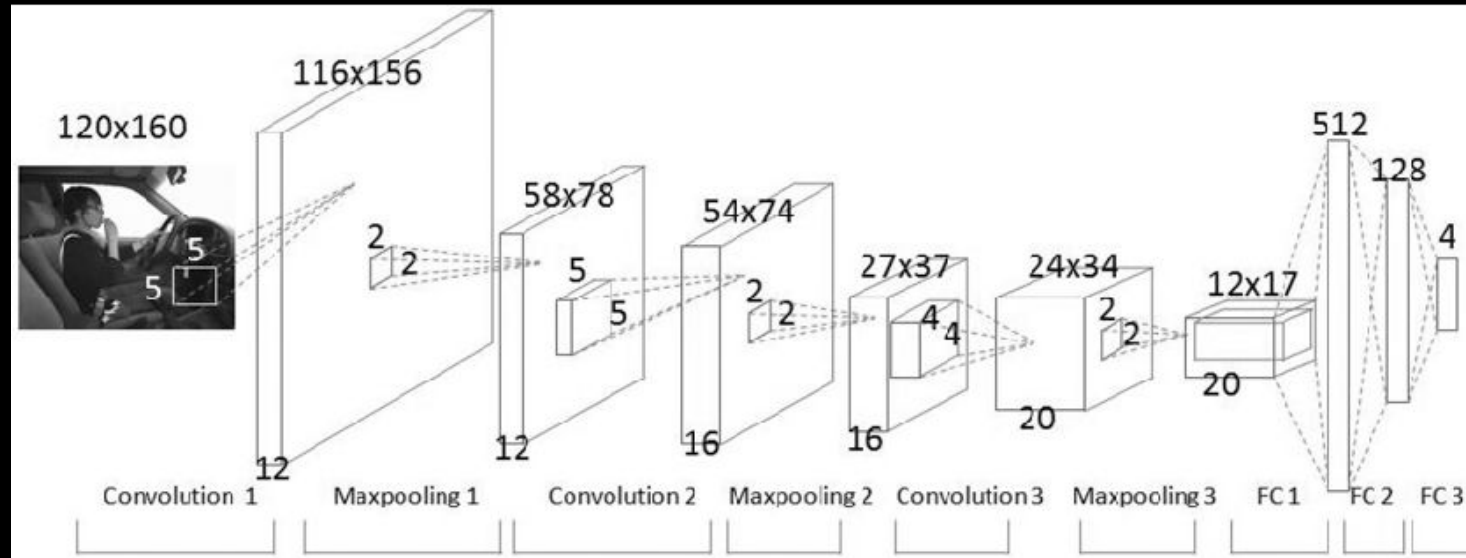




# Pooling Layer

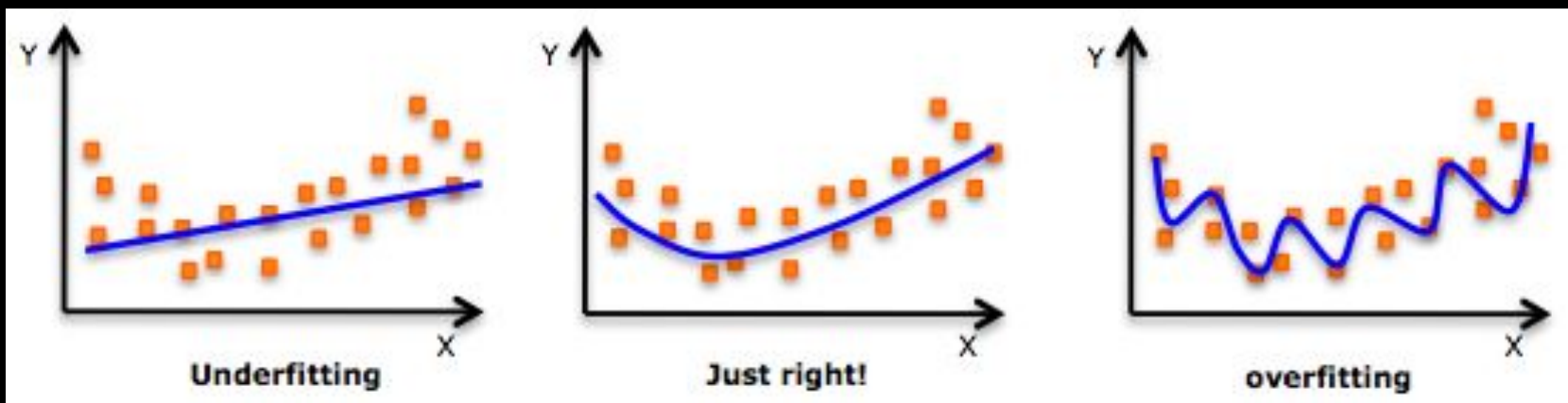


# CNN 사용 예

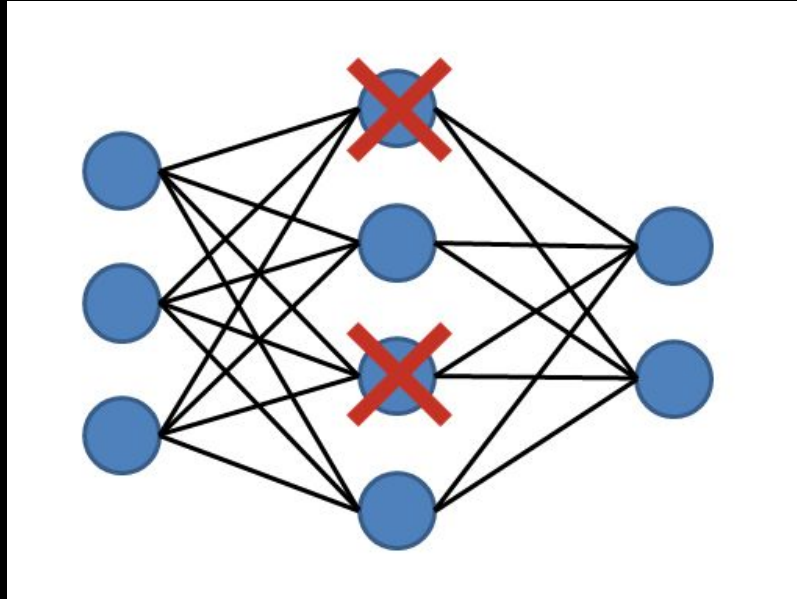


# Overfitting

# Overfitting (과적합)



# Dropout



매 Epoch 마다 랜덤한 특정 뉴런들을 없는 것으로 간주  
Fit에서만 Dropout 적용  
Validation / Test / Predict 등에서는 적용되지 않음

**Q&A**